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EXAMINER

SONG, MATTHEW J

ART UNIT	PAPER NUMBER
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1722

DATE MAILED: 07/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/728,193

Applicant(s)

MORITA, ETSUO

Examiner

Matthew J. Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1,2,4-6,8-20,23-25,27 and 28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-10 and 27 is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,11-20,23-25 and 28 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.
2. Applicant's arguments, see page 2 of the remarks, filed 7/6/2006, with respect to the 35 U.S.C 103 rejection have been fully considered and are persuasive. The rejection of claims 1-2, 4-6, 8-20, 23-25 and 27-28 has been withdrawn.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 11-16, 18, 23, 24, 25, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Hayashi et al (US 6,319,742).

In a method of forming a nitride semiconductor layer, note entire reference, Hayashi et al discloses a sapphire substrate **21** (Fig 13 and col 12, ln 15-30), this reads on applicant's basal body. Hayashi et al also discloses forming a striped pattern of GaN **23** (col 12, ln 1-67 and Fig 13), this reads on applicant's first III-V nitride pattern including a plurality of first elements

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distributed in a lateral direction at a pitch forming an elongated stripe. Hayashi et al also teaches forming a second III-V pattern including a plurality of elements **31** distributed in a lateral direction forming an elongated stripe and each of the elements having at least one width measured in the lateral direction (col 13, ln 10-67 and Fig 13).

According to Fig 13, the pitch (the width of the pattern element **31** and the gap between the next pattern element) is clearly different from the width of the raised stripe of layer **23** and the width of the gap between the stripe, this reads on applicant's the pitch of the first pattern and the pitch of the second pattern are different. Also in Fig 13, the pattern element **31** partially overlaps and partially does not overlap the raised pattern element of layer **23** due partially to the size of the elements and the gap, which reads on applicant's second pattern partly overlies and partly overlies and partly does not overlie the first pattern in the direction of the thickness of the crystal due to at least in part to the different pitches of the first and second pattern.

Referring to claim 2, the width of the first pattern elements (stripes of crystals **23**) and the width of the second pattern elements (stripes of crystal **31**) are clearly different in Fig 13, and the second pattern partly overlies and partly overlies and partly does not overlie the first pattern in the direction of the thickness of the crystal due to at least in part to the different widths of the first and second pattern.

Referring to claim 11, Hayashi et al discloses a patterned layer **23** on the basal body **21** with a base layer **22** in between, a growth step of forming an intermediate layer **24** on the surface of the base layer with the first pattern **23** formed thereon, a second pattern **31** is formed and a a second growth step in which a top layer **32, 33** is deposited on the surface of the intermediate

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layer with the second pattern formed thereon (Fig 13). Hayashi et al also discloses a striped pattern of masking material comprising SiO_2 30 (Fig 13 and col 14, ln 20-60).

Referring to claim 12-13, Hayashi et al discloses a SiO_2 masking layer (col 14, ln 20-45).

Referring to claim 14, Hayashi et al disclose sapphire, MgAl_2O_4 or SiC substrate (col 13, ln 50-60).

Referring to claim 15, Hayashi et al discloses a III-V nitride layer 22.

Referring to claim 16, Hayashi et al disclose a forming a masking layer 30 and selectively etching through layer 22, 23 using the masking layer 30 (col 14, ln 1-67).

Referring to claim 18, Hayashi et al discloses etching the base layer, this reads on applicant's forming a indentation.

Referring to claim 23, Hayashi et al discloses forming a light emitting portion 32, 33, 34,36 in Fig 13 (col 13, ln 55-67). Hayashi et al is silent to the light emitting overlies a region of crystal where the second pattern overlies the first pattern so that dislocations that may form in the crystal adjacent the basal body generally do not reach the light emitting layer, however this feature is viewed as intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Hayashi et al discloses a first and second pattern and a light emitting layer overlying the patterns therefore is capable of performing the claimed intended use of preventing dislocation from reaching the light emitting layer.

Referring to claim 25, Hayashi et al discloses the width of the patterns **23,30** and the widths of patterns **31** are different.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al (US 6,319,742).

Hayashi et al discloses all of the limitations of claim 4, as discussed previously, except the claimed relationship between the pitch of the first and second pattern.

Hayashi et al teaches the the width of the regions are preferably small, not more than 10 μm , and specifically 5 μm (col 15, ln 15-30 and col 12, ln 20-35). Based on Fig 13 and a width

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of 5 μm , the pitch of the first pattern would be 10 μm and the second would be approximately 15 μm , which would satisfy the claimed relationship ($\sim 30 \mu\text{m}$). Also, the relationship would have been obvious to one of ordinary skill in the art at the time of the invention because Hayashi et al teaches features less than 10 μm and changes in size are held to be obvious (MPEP 2144.03).

Referring to claim 5, Hayashi et al teaches an irregular pattern, this clearly suggests a plurality of pitches (col 13, ln 10-20).

7. Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al (US 6,319,742) in view of Fleming et al (US 6,358,854).

Hayashi et al discloses all of the limitations of claim 17, as discussed previously, except the second pattern forming step comprises depositing a masking material, etching using the masking material and removing the masking material. Hayashi et al is silent to how the stripes 31 are formed.

In a method of forming a layered structure, note entire reference, Fleming et al teaches patterning can be accomplished using a photolithographic etch mask over a layer with a plurality of openings in the etch mask at the locations where the material in the layer is to be removed. Etching is performed to remove the material below the mask then the etch mask is tripped (col 7, ln 1-20). Fleming et al also teaches III-V material can be used (col 9, ln 1-10).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Hayashi et al by using the conventionally known technique of masking taught by Fleming to produce the patterned structure taught by Hayashi et al because masking

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conventionally known and can be easily combined with Hayashi et al because Hayashi et al teaches masking and etching other layers (col 14, ln 20-65).

Referring to claim 17, the combination of Hayashi et al and Fleming et al teaches forming a masking pattern on a layer, etching the layer and removing the mask after etching ('854 col 7, ln 1-20), which can be used to form the pattern of material 31 ('742 Fig 13).

8. Claims 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al (US 6,319,742) in view of Major et al (US 5,689,123).

Hayashi et al discloses all of the limitations of claim 20, as discussed previously, except separating the basal body from the crystal.

In a method of forming a III-V device, note entire reference, Major et al teaches a light emitting device formed on a substrate. Major et al also teaches it is possible to remove the substrate by selectively etching after formation of the layers of III-V material so that light can enter the device unobstructed (col 18, ln 1-30 and col 16, ln 1-15).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Hayashi et al by removing the substrate from the crystal layers, as taught by Major et al, so that light is not obstructed.

Allowable Subject Matter

9. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claims 8-10 and 27 are allowed.

11. The following is an examiner's statement of reasons for allowance: The closest prior art is Hayashi et al (US 6,319,742). Hayashi et al disclose a first pattern 23 and a second pattern 31, which have different pitches and regions where the second pattern partly does and does not overlie the first pattern (Fig 13). Hayashi et al teaches stripes of the material for forming a light emitting device (Fig 21). Hayashi et al does not teach or suggest that the first pattern and second pattern have longitudinal and lateral pitches that are substantially the same.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

12. Applicant's arguments with respect to claims 1, 2, 4-5, 11-20, 23-25 and 28 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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Matthew J Song
Examiner
Art Unit 1722

MJS
July 18, 2006